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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/786,199

02/25/2004

David John Bishop

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3697

7590

04/19/2006

Michael J. Urbano  
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EXAMINER

MOSS, KERI A

ART UNIT

PAPER NUMBER

1743

DATE MAILED: 04/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	10/786,199	BISHOP ET AL.	
	Examiner	Art Unit	
	Keri A. Moss	1743	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) 12-21 is/are withdrawn from consideration.
- 5) ☒ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 July 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. ____.  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>2/25/04</u> .   | 6) <input type="checkbox"/> Other: ____.                                    |

**DETAILED ACTION**

***Election/Restrictions***

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1-11, drawn to a microfluidic apparatus for evaporating a substance, classified in class 159, subclass 43.1.
  - II. Claims 12-13, drawn to a microfluidic apparatus comprising two substrates separated by a membrane and heating and cooling means, classified in class 210, subclass 321.6.
  - III. Claims 14-21, drawn to a method of altering concentrations of two substances in a fluid, classified in class 436, subclass 181.
2. Inventions I and II are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different modes of operation, different functions, or different effects (MPEP § 806.04, MPEP § 808.01). In the instant case the different inventions have different modes of operation as group I operates without cooling or condensing the gas and group I operates with only one substrate. Different effects in that group II separates the evaporated gas from the fluid so that the gas cannot return to the fluid. Different effects in that group II results with two compounds separated from each other, whereas in group I, the two substances constantly intermingle as the gas inevitably condenses into the fluid.
3. Inventions I/II and III are related as product and process of use. The inventions can be shown to be distinct if either or both of the following can be shown: (1) the

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process for using the product as claimed can be practiced with another materially different product or (2) the product as claimed can be used in a materially different process of using that product (MPEP § 806.05(h)). In the instant case the product as claimed can be used in a materially different process, such as a reaction with controlled evaporation (for group I) or for labeling one compound as it passes through the membrane (group II).

4. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

5. Because these inventions are distinct for the reasons given above and the search required for Group I is not required for Group II and the search required for Group III is not required for Groups I or II, restriction for examination purposes as indicated is proper.

6. During a telephone conversation with Mr. Michael Urbano on April 13, 2006 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-11. Affirmation of this election must be made by applicant in replying to this Office action. Claims 12-21 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-2, 6-7 and 10-11 are rejected under 35 U.S.C. 102(b) as anticipated by Bonne (USP 6393894). In Figure 1, Bonne discloses an apparatus comprising a substrate 12, a micro-fluidic (column 4 lines 11-19) elongated channel 32 formed on the substrate, an input port 34 and an output port 36 and an evaporation controller 14 comprising a heater 20, 22, 24, 26 coupled to the substrate. The controller operates the heater in a pulsed mode (column 2 lines 1-11). Figure 6 discloses a collection chamber 126. In Figure 9, the elongated channel has a serpentine shape. The surfaces of the channel contain a coating (column 4 lines 31-41).

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bonne in view of Fish (USP 6,827,080). Bonne does not disclose a gas-permeable, liquid impermeable membrane disposed between the channel and the ambient region or a means for condensing the gas that is collected from the sample fluid. Fish discloses a gas permeable and liquid impermeable membrane that separates a fluid from its evaporated gases (paragraph bridging columns 9 and 10) and prevents gas that has condensed from traveling back through the membrane (paragraph bridging columns 9 and 10). Fish teaches a means of condensing gas such as cooling (column 9 lines 25-65). An advantage of using a gas permeable, liquid impermeable membrane and cooling means in an apparatus is that it separates the gas from the liquid components and, additionally, when the gas is separated from the liquid components, separate reactions or processes with the liquid or the gas can be carried out (column 2 line 47-column 3 line 10). It would have been obvious to one of ordinary skill in the art to

modify the structure and method of using the Bonne concentration apparatus with the teachings of Fish to employ a gas permeable, liquid impermeable membrane in order to gain the advantages of isolating gas from liquid components and subsequently conducting separate reactions.

7. Claims 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bonne in view of Kempe (USP 5,897,838). Bonne does not disclose a means or method for evaporating by reducing the pressure of the ambient region by blowing a gas across the interface of the fluid and the ambient region. It is well known in the art that blowing air over a liquid interface decreases the air pressure and induces evaporation. Kempe discloses such a method (column 3 lines 1-10). Kempe further discloses that this method of evaporation has the additional advantage of a faster rate of evaporation and can be done at room temperature (column 3 lines 11-17). Therefore, it would have been obvious to one of ordinary skill in the art to combine Bonne's concentration structure and method with Kempe's structure and method in order to increase the rate of evaporation.

### ***Conclusion***

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Apffel (USP 6,607,644) discloses a microfluidic device with two substrates separated by a membrane. Ninomiya (USP 5,138,105) teaches a method of

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increasing concentration of the components of a fluid by evaporating one component then cooling it.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Keri A. Moss whose telephone number is 571-272-8267. The examiner can normally be reached on 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on (571) 272-1700. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KAM 04/14/06

  
Jill Warden  
Supervisory Patent Examiner  
Technology Center 1700